

Nos. 22-1350, -1351

In the
United States Court of Appeals
for the Federal Circuit

APPLE INC.,
Appellant,

v.

COREPHOTONICS, LTD.,
Appellee.

On Appeal from the Patent Trial and Appeal Board in
Inter Partes Review Nos. IPR2022-00905 and IPR2022-00906

PATENT OWNER-APPELLEE
COREPHOTONICS, LTD.'S RESPONSIVE BRIEF

Marc A. Fenster
mfenster@raklaw.com
Neil A. Rubin
nrubin@raklaw.com
James S. Tsuei
jtsuei@raklaw.com
RUSS AUGUST & KABAT
12424 Wilshire Blvd., 12th Floor
Los Angeles, CA 90025
Tel: (310) 826-7474
Fax: (310) 826-6991

*Attorneys for Patent Owner-
Appellee Corephotonics, Ltd.*

Dated: October 3, 2022

CLAIM LANGUAGE AT ISSUE
U.S. PATENT NO. 10,225,479, CLAIMS 1 AND 19

1. A dual-aperture digital camera for imaging an object or scene, comprising:
 - a) a Wide camera comprising a Wide lens and a Wide image sensor, the Wide camera having a respective field of view FOV_W and being operative to provide a Wide image of the object or scene;
 - b) a Tele camera comprising a Tele lens and a Tele image sensor, the Tele camera having a respective field of view FOV_T narrower than FOV_W and being operative to provide a Tele image of the object or scene, wherein the Tele lens has a respective effective focal length EFL_T and total track length TTL_T fulfilling the condition $EFL_T/TTL_T > 1$;
 - c) a first autofocus (AF) mechanism coupled mechanically to, and used to perform an AF action on the Wide lens;
 - d) a second AF mechanism coupled mechanically to, and used to perform an AF action on the Tele lens; and
 - e) a camera controller operatively coupled to the first and second AF mechanisms and to the Wide and Tele image sensors and configured to control the AF mechanisms and to process the Wide and Tele images to create a fused image, wherein areas in the Tele image that are not focused are not combined with the Wide image to create the fused image and wherein the camera controller is further operative to output the fused image with a point of view (POV) of the Wide camera by mapping Tele image pixels to matching pixels within the Wide image.

19. A dual-aperture digital camera for imaging an object or scene, comprising:

- a) a Wide camera comprising a Wide lens and a Wide image sensor, the Wide camera having a respective field of view FOV_W and being operative to provide a Wide image of the object or scene;
- b) a Tele camera comprising a Tele lens and a Tele image sensor, the Tele camera having a respective field of view FOV_T narrower than FOV_W and being operative to provide a Tele image of the object or scene, wherein the Tele lens has a respective effective focal length EFL_T and total track length TTL_T fulfilling the condition $EFL_T/TTL_T > 1$;
- c) a first autofocus (AF) mechanism coupled mechanically to, and used to perform an AF action on the Wide lens;
- d) a second AF mechanism coupled mechanically to, and used to perform an AF action on the Tele lens, wherein the Wide and Tele lenses have different F numbers $F\#_{Wide}$ and $F\#_{Tele}$, wherein the Wide and Tele image sensors have pixels with respective pixel sizes $Pixel\ size_{Wide}$ and $Pixel\ size_{Tele}$ wherein $Pixel\ size_{Wide}$ is not equal to $Pixel\ size_{Tele}$, and wherein the Tele camera has a Tele camera depth of field (DOF_T) shallower than a DOF of the Wide camera (DOF_W); and
- e) a camera controller operatively coupled to the first and second AF mechanisms and to the Wide and Tele image sensors and configured to control the AF mechanisms, to process the Wide and Tele images to find translations between matching points in the images to calculate depth information and to create a fused image suited for portrait photos, the fused image having a DOF shallower than DOF_T and having a blurred background.

FORM 9. Certificate of Interest

Form 9 (p. 1)
July 2020

**UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT**

CERTIFICATE OF INTEREST

Case Number 22-1350, 22-1351
Short Case Caption Apple Inc. v. Corephotonics, Ltd.
Filing Party/Entity Corephotonics, Ltd.

Instructions: Complete each section of the form. In answering items 2 and 3, be specific as to which represented entities the answers apply; lack of specificity may result in non-compliance. **Please enter only one item per box; attach additional pages as needed and check the relevant box.** Counsel must immediately file an amended Certificate of Interest if information changes. Fed. Cir. R. 47.4(b).

I certify the following information and any attached sheets are accurate and complete to the best of my knowledge.

Date: 10/03/2022

Signature: /s/ Neil A. Rubin

Name: Neil A. Rubin

FORM 9. Certificate of Interest

Form 9 (p. 2)
July 2020

1. Represented Entities. Fed. Cir. R. 47.4(a)(1).	2. Real Party in Interest. Fed. Cir. R. 47.4(a)(2).	3. Parent Corporations and Stockholders. Fed. Cir. R. 47.4(a)(3).
Provide the full names of all entities represented by undersigned counsel in this case.	Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities. <input checked="" type="checkbox"/> None/Not Applicable	Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities. <input type="checkbox"/> None/Not Applicable
Corephotonics, Ltd.		Samsung Electronics Benelux B.V.

☐ Additional pages attached

FORM 9. Certificate of Interest

Form 9 (p. 3)
July 2020

4. Legal Representatives. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

☐ None/Not Applicable

☐ Additional pages attached

C. Jay Chung (formerly of Russ August & Kabat LLP)		
Jonathan Link (of Russ August & Kabat LLP)		

5. Related Cases. Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. Do not include the originating case number(s) for this case. Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

☐ None/Not Applicable

☐ Additional pages attached

Corephotonics, Ltd. v. Apple Inc., Case No. 5:19-cv-04809 (N.D. Cal.)		

6. Organizational Victims and Bankruptcy Cases. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

☒ None/Not Applicable

☐ Additional pages attached

TABLE OF CONTENTS

CLAIM LANGUAGE AT ISSUE	i
CERTIFICATE OF INTEREST.....	iii
TABLE OF CONTENTS	vi
TABLE OF AUTHORITIES	viii
STATEMENT OF RELATED CASES.....	x
PRELIMINARY STATEMENT	1
STATEMENT OF THE ISSUES	2
SUMMARY OF THE ARGUMENT	3
ARGUMENT	7
I. In the -00905 IPR, the Board Correctly Construed the Claim Term “Fused Image with a Point of View of the Wide Camera” and Its Determination That Apple Failed to Establish Parulski Teaches That Limitation Should Be Affirmed.....	7
A. The Board Correctly Followed the Patentee’s Lexicography, Holding that the “Point of View of the Wide Camera” Must Retain Both the Positions and Shapes of Objects in the Wide Image	7
B. The Board’s Construction Is Fully Consistent with the Claim Language and Usage of the Terms in the Specification and Does Not Render Other Claims Superfluous	19
C. Parulski Does Not Render the Disputed Limitation Obvious, Under Either Construction	24

II.	In the -00906 IPR, the Board Correctly Found that Apple Failed to Meet Its Burden of Demonstrating a Reasonable Expectation of Success, Based Upon Evidence and Arguments That Were Timely Raised in the IPR	35
A.	Corephotonics Clearly Raised the Issue of Reasonable Expectation of Success and Showed that Errors by Apple’s Expert Undermined Apple’s <i>Prima Facie</i> Case on This Issue; Apple Declined to Address These Errors in Its Reply	35
B.	Substantial Evidence Supports the Board’s Determination that Apple Had Failed to Establish a Reasonable Expectation of Success.....	45
C.	Apple Had Proper Notice of the Issues and Evidence Underlying the Board’s Decision and Its Need to Respond to Them; Apple Is Not Entitled to Remand Under the Administrative Procedure Act.....	47
CONCLUSION		51
CERTIFICATE OF COMPLIANCE.....		52

TABLE OF AUTHORITIES

Cases

<i>Amgen Inc. v. F. Hoffman-La Roche Ltd</i> , 580 F.3d 1340 (Fed. Cir. 2009).....	35
<i>Belden Inc. v. Berk-Tek LLC</i> , 805 F.3d 1064 (Fed. Cir. 2015).....	26
<i>Carrum Techs., LLC v. Unified Patents, LLC</i> , No. 20-2204, 2021 WL 3574209 (Fed. Cir. Aug. 13, 2021).....	30
<i>Comcast Cable Commun., LLC v. Promptu Sys. Corp.</i> , 838 Fed. Appx. 555 (Fed. Cir. 2021)	45
<i>General Electric Co. v. Raytheon Techs. Corp.</i> , 983 F.3d 1334 (Fed. Cir. 2020).....	32
<i>Helmsderfer v. Bobrick Washroom Equip., Inc.</i> , 527 F.3d 1379 (Fed. Cir. 2008).....	21
<i>Immunex Corp. v. Sanofi-Aventis U.S. LLC</i> , 977 F.3d 1212 (Fed. Cir. 2020).....	18
<i>In re Google Tech. Holdings LLC</i> , 980 F.3d 858 (Fed. Cir. 2020).....	26
<i>In re IPR Licensing, Inc.</i> , 942 F.3d 1363 (Fed. Cir. 2019).....	49
<i>In re Stepan Co.</i> , 868 F.3d 1342 (Fed. Cir. 2017).....	33
<i>Kaken Pharm. Co., Ltd. v. Iancu</i> , 952 F.3d 1346 (Fed. Cir. 2020).....	24
<i>Nike, Inc. v. Adidas AG</i> , 955 F.3d 45 (Fed. Cir. 2020).....	49

<i>Nobel Biocare Services AG v. Intradent USA, Inc.</i> , 903 F.3d 1365 (Fed. Cir. 2018).....	21
<i>PharmaStem Therapeutics, Inc. v. ViaCell, Inc.</i> , 491 F.3d 1342 (Fed. Cir. 2007).....	48
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005).....	11, 19
<i>Praxair Distrib., Inc. v. Mallinckrodt Hosp. Products IP Ltd.</i> , 890 F.3d 1024 (Fed. Cir. 2018).....	30
<i>Qualcomm Inc. v. Intel Corp.</i> , 6 F.4th 1256 (Fed. Cir. 2021)	50
<i>SAS Inst., Inc. v. ComplementSoft, LLC.</i> , 825 F.3d 1341 (Fed. Cir. 2016).....	50
<i>Scanner Techs. Corp. v. ICOS Vision Sys. Corp., N.V.</i> , 365 F.3d 1299 (Fed. Cir. 2004).....	18

STATEMENT OF RELATED CASES

This is the only appeal from the *inter partes* review proceedings that are at issue, and this is the only appeal that involves U.S. Patent No. 10,225,479.

The Court's decision in this appeal is likely to affect the following district court case where the '479 patent is presently asserted:

- *Corephotonics, Ltd. v. Apple Inc.*, Case No. 3:19-cv-04809-JD (N.D. Cal.)

The Court has designated this appeal a companion to the following pending appeals:

- *Apple Inc. v. Corephotonics, Ltd.*, No. 22-1324
- *Corephotonics, Ltd. v. Apple Inc.*, Nos. 22-1340, 22-1341
- *Corephotonics, Ltd. v. Apple Inc.*, Nos. 22-1455, 22-1456

The Court has also designated this appeal as related to the following pending appeal:

- *Apple Inc. v. Corephotonics, Ltd.*,
Nos. 22-1325, 22-1327, 22-1453, 22-1457

PRELIMINARY STATEMENT

The Board correctly decided both of these IPRs, determining that Apple had failed to carry its burden of showing that the challenged claims of the '479 patent were invalid. The Board's decisions should be affirmed.

The '479 patent clearly defines the term "point of view (POV)" as depending on both the positions and shapes of objects in an image. The Board correctly followed the patentee's lexicography in construing the disputed term. The patent goes on to introduce "position POV" and "perspective POV" as terms that are related to, but distinct from "point of view," each relating to only one of the two aspects of objects that define the "point of view." The patent does not present these as examples of the defined term "point of view," as Apple argues, but rather as derived concepts. Accordingly, the Board's construction of the disputed claim term in the -00905 IPR should be affirmed.

The Board's factual findings in both of the IPRs are supported by substantial evidence and should be affirmed. Apple's request to remand to have an opportunity to respond to the Board's findings should be rejected. The issue of reasonable expectation of success was clearly raised by Corephotonics in its response to Apple's petition, as were the errors in

Apple's experts analysis that undermined Apple's *prima facie* evidence on this issue. The Board was not required to give Apple an extra opportunity to address these errors after Apple failed to do so in its reply.

STATEMENT OF THE ISSUES

Apple mischaracterizes both issues in the appeal. First, while Apple argues for reversal as to all claims challenged in the -00905 IPR, Apple's brief fails to even mention the prior art grounds at issue in grounds 2–4 of the IPR challenging claims 2–9, 15, 24–31, and 37 or to address the arguments that Corephotonics presented that were unique to these grounds. Accordingly, Apple has forfeited its appeal as to claims 2–9, 15, 24–31, and 37.

Second, Apple incorrectly states that no party argued that the error in simulating the proposed lens design was material to the obviousness inquiry. Corephotonics identified the error in its response brief and argued that this error made the lens performance calculations from Apple's expert incorrect. As those lens performance calculations were part of Apple's *prima facie* case on an issue where Apple bears the burden, the error was necessarily material.

SUMMARY OF THE ARGUMENT

1. In the -00905 IPR, the Board correctly construed the disputed term “fused image with a point of view of the wide camera” as “a fused image having a Wide perspective POV and a Wide position POV.” The parties agree that the construction of this term is controlled by the intrinsic record, and the parties both focus on a single paragraph from the specification in interpreting the term. The first two sentences of this key paragraph are straightforwardly lexicographic. The first sentence introduces a concept: “a given object will be shifted and have different perspective (shape)” as that object is seen by two different cameras. Then the second sentence gives that concept (shifting position and changing perspective) a name: “point-of-view (POV).”

The subsequent sentences of the paragraph introduce derived terms “perspective POV” and “position POV,” which each capture some, but not all, aspects of the “POV.” But when the specification uses the term “POV” itself, it uses that term consistently with its lexicography, requiring that both the positions and shapes of objects match. Accordingly, the Board was correct to recognize that an image must match both perspective POV and position POV in order to match “POV,” not merely one or the other.

Contrary to Apple’s arguments, the Board’s construction is consistent with the claim language, consistent with the use of the terms in the specification, does not improperly exclude disclosed embodiments from the claims, and does not render dependent claims superfluous. Because Apple’s papers and expert opinions in the IPR did not even argue that the prior art satisfied this correct construction, the Board’s finding of non-obviousness should be affirmed.

Apple’s belated argument that the prior art satisfies this construction due to a purported “concession” in Corephotonics’ sur-reply is both untimely and fails to actually establish anything concerning the prior art and obviousness, and it should be rejected. In the event that the Board does reverse the Board’s claim construction, the Board should remand to the Board, rather than reversing without remand as Apple suggests, to give the Board the opportunity to address Corephotonics’ multiple arguments against obviousness that apply under any claim construction, which Corephotonics raised but that the Board had no need to address in view of its claim construction decision.

2. In the -00906 IPR, the Board correctly determined that Apple had failed to carry its burden of presenting evidence of a reasonable expectation of success for Apple's proposed obviousness combination. The lack of a reasonable expectation of success was a core argument in Corephotonics' papers, supported by extensive evidence and expert opinion. This evidence included published papers of Apple's expert and the dissertation of his Ph.D. student, showing that those skilled in the art would not have expected the "scaling" of the Ogata prior art lens prescription down by a factor of 6.114 that Apple proposes to have yielded a successful lens.

As part of this evidence, Corephotonics pointed out that Apple's expert had made an error in conducting his lens design software analysis which rendered his lens performance calculations for the proposed scaled Ogata lens incorrect. In spite of introducing a reply declaration from its expert that provided lens design software analysis of a new proposed modification to a different prior art lens, Apple's reply did not attempt to correct the errors in its expert's analysis of the scaled Ogata lens or to explain why the lens performance calculations were still reliable. Apple

does not dispute that its expert made the error identified by Corephotonics or that the performance calculations are incorrect as a result of that error specifically.

Apple suggests that it showed an expectation of success, even without its expert's analysis, by citing to a paragraph in a textbook by Smith. But it did not argue that Smith alone (unsupported by its expert's analysis) showed a reasonable expectation of success before the Board, and a review of the surrounding paragraphs and related sections of Smith shows it could not have plausibly shown a reasonable expectation of success with Smith alone. The Board's determination that Apple failed to present sufficient evidence of a reasonable expectation of success was supported by substantial evidence.

Apple argues that it is entitled to remand under the Administrative Procedure Act, but there was no new issue raised by the Board *sua sponte* or new evidence relied upon by the Board *sua sponte* as in the cases that Apple cites in support of remand. Those cases involved the Board deviating from an apparently settled claim construction, introducing a new prior art reference in finding a claim obvious, or materially misunderstanding the parties' arguments. Here, the Board found a failure to

demonstrate a reasonable expectation of success, based on undisputed errors in Apple’s *prima facie* evidence on the issue that Corephotonics timely pointed out and Apple simply failed to address in its reply. The additional discrepancies in Apple’s expert’s analysis that the Board identified *sua sponte* did not form a basis of the Board’s conclusions, because the undisputed error identified by Corephotonics was sufficient to render the expert’s scaled Ogata lens performance calculations incorrect, whether there were additional discrepancies or not. Apple is not entitled to a remand under the APA.

ARGUMENT

I. In the -00905 IPR, the Board Correctly Construed the Claim Term “Fused Image with a Point of View of the Wide Camera” and Its Determination That Apple Failed to Establish Parulski Teaches That Limitation Should Be Affirmed

A. The Board Correctly Followed the Patentee’s Lexicography, Holding that the “Point of View of the Wide Camera” Must Retain Both the Positions and Shapes of Objects in the Wide Image

As Apple’s brief explains, changing the “point of view” a scene is captured from can change the resulting image in two ways: (1) by changing the positions of objects within the image and (2) by changing the perspective (or shape) of the objects within the image. Blue Br. 9–10. This is

illustrated in the following examples from a textbook cited by Apple, showing two scenes, each captured from two different points of view:



(a)



(b)



(d)



(e)

Appx2400.

Relying on the specification and figures of the '479 patent, the Board correctly concluded that the term “point of view” within the claim phrase “fused image with a point of view (POV) of the wide camera” requires that the objects in the fused image retain **both** the positions **and** shapes that

they have in the images photographed from the point of view of the wide camera. Appx9–12.

If the positions of objects in a fused image match the positions of objects in the wide camera image, but the shapes of objects are different from the shapes in the wide camera image, then the fused image does not have the wide camera “point of view.” For example, moving the model of the Greek temple in image (d) from the textbook above so that its position matches that in image (e) is not going to produce an image whose point of view matches that of image (e), so long as the perspective of the object—e.g. its shape visible in the roof line or the stairs—still looks like that in image (d). Likewise, if the shapes of objects in a fused image match the shapes in the wide camera image, but the positions of objects are different, that fused image does not have the wide camera “point of view.”

The parties agree that the construction of this term is controlled by the intrinsic record and that there is no prosecution history relevant to the term. Blue Br. 35–40. The parties further agree that the relevant disclosure in the specification of the ’479 consists of a single paragraph:

In a dual-aperture camera image plane, as seen by each sub-camera (and respective image sensor), a given object will be

shifted and have different perspective (shape). This is referred to as point-of-view (POV). The system output image can have the shape and position of either sub-camera image or the shape or position of a combination thereof. If the output image retains the Wide image shape then it has the Wide perspective POV. If it retains the Wide camera position then it has the Wide position POV. The same applies for Tele images position and perspective. As used in this description, the perspective POV may be of the Wide or Tele sub-cameras, while the position POV may shift continuously between the Wide and Tele sub-cameras. In fused images, it is possible to register Tele image pixels to a matching pixel set within the Wide image pixels, in which case the output image will retain the Wide POV (“Wide fusion”). Alternatively, it is possible to register Wide image pixels to a matching pixel set within the Tele image pixels, in which case the output image will retain the Tele POV (“Tele fusion”). It is also possible to perform the registration after either sub-camera image is shifted, in which case the output image will retain the respective Wide or Tele perspective POV.

Appx66 (5:10–33). The Board rested its claim construction on this paragraph, Appx10–11, and this is the only paragraph from the specification that Apple cites in its claim construction argument, Blue Br. 35–40.

The first two sentences of this paragraph are straightforwardly lexicographic:

In a dual-aperture camera image plane, as seen by each sub-camera (and respective image sensor), a given object will be shifted and have different perspective (shape). This is referred to as point-of-view (POV).

Appx66 (5:10–14). First, they introduce a concept: “a given object will be shifted **and** have different perspective (shape)” as that object is seen by two different cameras. Appx66 (5:10–12) (emphasis added). Then they give that concept (shifting position **and** changing perspective) a name: “point-of-view (POV).” Appx66 (5:12–14). *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (“the inventor's lexicography governs”).

If the paragraph ended there, there likely would be no dispute between the parties. But Apple points to later statements in this paragraph to argue that POV has a broader meaning, referring to either the positions of objects **or** the shapes of objects, not the positions **and** shapes as indicated by the first two sentences in the specification paragraph.

After introducing the concept of POV, the paragraph devotes four sentences to introducing the concepts of “perspective POV” and “position POV”:

If the output image retains the Wide image shape then it has the Wide perspective POV. If it retains the Wide camera position then it has the Wide position POV. The same applies for Tele images position and perspective. As used in this description, the perspective POV may be of the Wide or Tele sub-cameras, while the position POV may shift continuously between the Wide and Tele sub-cameras.

Appx66 (5:16–23).

Apple's brief assumes that "perspective POV" and "position POV" must each individually satisfy the definition of "POV," i.e., that they are species of a genus "POV." But there is no rule of the English language (or of claim construction) that placing one or more words at the front of a term necessarily indicates a species of the parent term. A "vice president," for example, is not a kind of "president." Rather, the concept of "vice president" is related to, and in some sense derived from, the concept of "president."

Suppose a document defined the term "judge" to mean "an official of the judicial branch with authority to decide lawsuits brought before courts."¹ Then that document goes on to explain that the executive branch has officials with roles that are similar in some respects to those of judges, with titles such as "administrative law judge," "administrative patent judge," and "immigration judge." A careful reader would not conclude that by using these other terms that contain the word "judge," the document has redefined the term "judge," when used by itself, to encompass executive branch officials.

¹ See definition of "judge" at https://www.uscourts.gov/glossary#letter_j.

Likewise in the '479 patent, the use of the terms “perspective POV” and “position POV” does not imply that the express definition provided for “POV” at lines 5:10–12 (Appx66) of the specification should be rewritten to make perspective POV and position POV species of the term POV. Rather, the most natural (and correct) interpretation of the paragraph introducing these concepts is that perspective POV and position POV are concepts related to, but less strict in their requirements, than the concept of POV itself.

Apple argues that the specification uses the terms “Wide POV” and “Tele POV” to refer to examples of Wide position POV and Tele position POV, and thus that position POV must be a type of “POV.” Blue Br. 38–40. This argument misinterprets the specification paragraph. First, it ignores the structure of the paragraph. While presented as a single paragraph, it has two distinct parts, each roughly a half of the paragraph. The first half introduces the term “POV” and the derived terms “perspective POV” and “position POV,” and the second half explains how the technique of registration can be used to produce fused images relating to certain of these terms:

Lines 5:10–23

In a dual-aperture camera image plane, as seen by each sub-camera (and respective image sensor), a given object will be shifted and have different perspective (shape). This is referred to as point-of-view (POV). The system output image can have the shape and position of either sub-camera image or the shape or position of a combination thereof. If the output image retains the Wide image shape then it has the Wide perspective POV. If it retains the Wide camera position then it has the Wide position POV. The same applies for Tele images position and perspective. As used in this description, the perspective POV may be of the Wide or Tele sub-cameras, while the position POV may shift continuously between the Wide and Tele sub-cameras.

Lines 5:23–33

In fused images, it is possible to register Tele image pixels to a matching pixel set within the Wide image pixels, in which case the output image will retain the Wide POV (“Wide fusion”). Alternatively, it is possible to register Wide image pixels to a matching pixel set within the Tele image pixels, in which case the output image will retain the Tele POV (“Tele fusion”). It is also possible to perform the registration after either sub-camera image is shifted, in which case the output image will retain the respective Wide or Tele perspective POV.

Appx66 (5:10–33) (highlighting added). Within each half of the paragraph, the discussions of POV and the derived terms flow in parallel. Each half first describes “POV” and output images having the “POV” of either the wide or tele camera. Each half then turns to various scenarios where only the position POV or only the perspective POV of the output matches that of a given camera.

Apple's interpretation breaks this obviously parallel structure and argues that the uses of "Wide POV" and "Tele POV" in the second half actually refer to the wide and tele cameras' "position POVs," rather than their POVs for both position and shape. This is a surprising claim on its face. The first half of the paragraph went to the trouble of defining a specific term for the concept of position POV. Why would the patentee then use the purportedly generic term of "POV" to refer to position POV, rather than use the more precise terminology that was just introduced? Why would the patentee then switch to using its precise terminology again, referring to "Wide . . . perspective POV" and "Tele perspective POV"?

Each of the three sentences in the second half of the paragraph describes a different use of registration in producing an output image: (1) registering to the wide image (without shifting that image first), (2) registering to the tele image (without shifting that image first), and (3) shifting one of the sub-camera images (wide or tele) and then registering to that shifted image. The final sentence, describing the shift-then-register approach, says that the result of this approach retains a perspective POV.

Apple argues that this statement implies that the earlier approaches, using registration without first shifting, would **not** retain the perspective POV.

Apple's interpretation gets the meaning of the final sentence exactly backwards. That sentence is not saying that the register-without-shifting approach fails to retain perspective POV. Rather, its point is that shifting-then-registering fails to retain position POV. It is not saying that an additional step is required to retain perspective POV, as Apple argues in its opening brief, Blue Br. 39, but rather that performing the additional step prevents the system from retaining position POV. It is not hard to understand why this should be. When an entire sub-camera image is shifted, the positions of objects in that image change, but the shapes of those objects does not. In other words, the shifted image still has the perspective POV of the unshifted image, but it does not have the position POV of the unshifted image. When you then register pixels to that previously shifted image, you understandably will **not** produce an output image with the **position** POV of the unshifted image, but you **can** produce an output image with the **perspective** POV of the unshifted image, because the shifting did not change the perspective POV.

In the register-without-shifting approaches, by contrast, you are registering pixels to the original wide or tele image, with objects having their original positions and shapes. Accordingly, this form of registration can produce an image that retains both the positions *and* shapes of the image being registered to, i.e., that retains its “POV” under Corephotonics’ and the Board’s construction.

While Corephotonics’ interpretation of the final sentence yields a paragraph that is readily understood, Apple’s interpretation renders the paragraph hard to explain. If registering to a sub-camera image that has had its position shifted (potentially to some position between the position of the wide and tele sub-cameras, Appx66 (5:20–23)) yields an output with object shapes that match the object shapes in the original sub-camera image, why would registering to the unshifted sub-camera image not also yield an output with shapes matching that unshifted image? Why would changing the positions of objects before registration affect the shapes of the objects in the output image? Apple offers no explanation for why this should be, beyond citing to the conclusory *ipse dixit* of their expert, offered for the first time in support of Apple’s reply. Blue Br. 39;

Appx3910–3911. The Board correctly rejected Apple’s interpretation of this final sentence.

The cases Apple cites are not inconsistent with the Board’s construction. *Scanner Techs.* simply applies the rule that use of the article “a” or “an” before an element in a “comprising” claim does not limit the claim to use of only a single one of that element, absent evidence of a clear intent to limit the claims. *Scanner Techs. Corp. v. ICOS Vision Sys. Corp., N.V.*, 365 F.3d 1299, 1304–05 (Fed. Cir. 2004). It has no bearing on the question of whether a patentee’s lexicography should be overridden to encompass other related but distinctly defined terms in the specification.

Immunex held that “human antibodies” should be construed to encompass “partially human” antibodies, but it did so based upon specific uses of the relevant terminology in that patent’s specification, which are not present in the ’479 patent at issue in the present case. *Immunex Corp. v. Sanofi-Aventis U.S. LLC*, 977 F.3d 1212, 1219 (Fed. Cir. 2020). For example, the specification in *Immunex* stated that “[t]he antibodies may be partially human, or preferably completely human,” and the Court determined that the antecedent for “the antibodies” was the phrase “human antibodies” in the preceding sentence. *Id.* In the ’479 patent, by contrast,

there is no statement that “POV” may be position POV or may be perspective POV. Perhaps more importantly, the specification in *Immunex*, as well as the claims in a related patent, repeatedly referred to both “human” and “fully human” antibodies, suggesting that “human antibodies” meant something different from (in this case broader than) “fully human antibodies.” *Id.* at 1219–20. In the ’479 patent, by contrast, there is no term used like “full POV.” The only term used to refer to POV that takes into account both position *and* shape is “POV.” Appx66 (5:10–13). Nothing in *Immunex* suggests that the Board should have departed from the patentee’s lexicography in this case and given “POV” a meaning different from that expressly given in the specification. *Phillips*, 415 F.3d at 1316.

B. The Board’s Construction Is Fully Consistent with the Claim Language and Usage of the Terms in the Specification and Does Not Render Other Claims Superfluous

Apple argues that the Board “ignored key aspects of the claim language,” Blue Br. 40, but it fails to identify anything in the claims that is actually inconsistent with the Board’s construction. For example, Apple does not argue that the image processing steps set forth in the claims could not achieve a “fused image with a point of view (POV) of the wide camera,” as that phrase has been construed by the Board. At most, Apple

shows that nothing in claim 1 compels the Board’s construction. Blue Br. 40–42. But that is not a justification for disregarding the patentee’s lexicography in the specification. Indeed, there would be little reason for lexicography or the rest of the teachings in *Phillips* concerning the use of the specification in claim construction, if those doctrines only applied when the claims themselves compelled the same construction.

Apple also argues against the Board’s construction on the grounds that it purportedly excludes disclosed embodiments. Blue Br. 42. But accepting *arguendo* that lines 5:10–33 of the ’479 patent specification describe multiple “embodiments,” claims 1 and 23 exclude many of these embodiments under Apple’s construction as well. The specification expressly refers to retaining “Tele POV,” Appx66 (5:29), or retaining “Tele perspective POV,” Appx66 (5:32–33). It also refers to a “position POV” that is “between the Wide and Tele sub-cameras.” Appx66 (5:22–23). But the disputed claim term expressly requires an image with the POV “of the Wide camera.” Under any plausible construction of this term—and under Apple’s proposed construction—these claims exclude the specification’s “embodiments” that retain a “Tele POV.”

But that does not mean that all of these purported embodiments are necessarily excluded from the '479 patent claims. Claims 19–22 contain no “POV” limitation, and there is nothing evident in those claims that would preclude a fused image that retained a “Wide position POV,” “Wide perspective POV,” “Tele POV,” etc. Appx70–71 (14:66–15:48). Under these circumstances, the “presumption” against excluding disclosed embodiments that Apple cites from *Nobel Biocare* does not apply. *Nobel Biocare Services AG v. Intradent USA, Inc.*, 903 F.3d 1365, 1381 (Fed. Cir. 2018). First, *Nobel Biocare* acknowledges that the presumption can be overcome by a “basis in the intrinsic record for excluding [the embodiments].” *Id.* Here there is a basis in the intrinsic record, namely the patentee’s definition of the term “POV” in the specification. Appx66 (5:10–14).

Furthermore, *Nobel Biocare* cites *Helmsderfer* in addressing the situation where a proposed construction excludes embodiments from only some of the claims. *Id.*; *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1383 (Fed. Cir. 2008). *Helmsderfer* explains that the presumption is one against excluding disclosed embodiments from the scope of the “invention” and that excluding embodiments from particular

claims is not excluding them from the scope of the “invention,” so long as those embodiments are not excluded from all claims. *Id.* (construing a term appearing in claim 1 according to its plain meaning, even though that would exclude the preferred embodiment and **every** illustrated embodiment, because there were other claims in the patent that did not include the disputed term). Even if we assume that every POV-related scenario mentioned in the ’479 patent specification amounts to a distinct disclosed embodiment, the Board’s construction does not exclude these embodiments from the scope of the “invention,” because it does not exclude them from the scope of claims 19–22. Under these circumstances, the presumption against excluding embodiments just not justify departing from the patentee’s lexicography, just to somewhat reduce the number of purported embodiments that are excluded from a subset of the claims.

Apple criticizes the Board’s analysis of Figure 5 of the ’479 patent. Blue Br. 43–46; Appx12. But what the Board determined, in substance, was (1) that Figure 5 is the sole figure that describes a method for generating a fused image and (2) that the output of the process in Figure 5

would satisfy the Board's construction of the disputed term. Appx12. Apple's brief does not dispute either of these determinations. Blue Br. 43–46. The fact that the sole embodiment of fusion described in detail within the '479 patent's specification and figures satisfies the Board's construction is not, by itself, conclusive evidence that the Board's construction is correct and Apple's construction incorrect. But together with the lexicography in column 5 of the specification, it does support the Board's construction.

Apple also argues that the Board's construction of the disputed term renders claim 6 of the patent superfluous. But all that the Board's construction addresses is the position and shape of objects in the fused image. Claim 6 and the claims it depends from require that the camera controller perform a series of steps, including resampling the Tele image according to a registration map, Appx70 (13:60–63), detecting errors in registration based upon that resampled image, Appx70 (13:64–67), and choosing pixel values to use based upon those detected errors, Appx70 (14:1–4). To the extent that Apple contends that this claimed series of steps (or even just the step of claim 6) are implied by the Board's construction (i.e., that there would be no way to satisfy the construction

without also satisfying claim 6), Apple certainly has not proven that implausible assertion, with its single paragraph of conclusory attorney argument. Blue Br. 45. And unless there is literally no way to satisfy the Board's construction of claim 1 without also performing the steps required by claim 6, the Board's construction does not render claim 6 superfluous.

C. Parulski Does Not Render the Disputed Limitation Obvious, Under Either Construction

Should the Court affirm the Board's claim construction—which it should for the reasons presented above—it should also affirm the Board's ultimate determination that Apple failed to demonstrate obviousness of the challenged claims, as that determination was supported by substantial evidence. Should the Court instead reverse the Board's claim construction, the appropriate course would be to vacate and remand the -00905 IPR to the Board. *Kaken Pharm. Co., Ltd. v. Iancu*, 952 F.3d 1346, 1355 (Fed. Cir. 2020) (“We conclude that the appropriate course in this case, as in so many others involving a reversal of a Board claim construction, is to vacate the Board's decision and remand the matter.”)

Moreover, to the extent that the Court remands (or reverses) any portion of the final written decision, that remand (or reversal) should be

limited to the first ground of the IPR, challenging claims 1, 10–14, 16, 18, 23, 32–36, 38, and 40 under the combination of Parulski with Konno. Appx22. The Board’s decisions concerning grounds 2–4, challenging claims 2–9, 15, 24–31, and 37 should be affirmed. *See* Appx22–23.

Grounds 2–4 challenged claims under combinations of Parulski and Konno with one or more of the references Szeliski, Segall, and Stein. Appx22–23. Corephotonics presented arguments against obviousness that were specific to these grounds and these additional references. *E.g.*, Appx288–292. The Board’s decision did not address those additional arguments, because its decisions concerning the independent claims at issue in ground 1 were sufficient to determine the outcomes of 2–4. Appx22. Apple’s opening brief fails to mention grounds 2–4 and fails to mention the Szeliski, Segall, and Stein prior art references. Accordingly, by failing to even raise these grounds in its opening brief, Apple has forfeited any challenge concerning these grounds.

1. Apple Presented No Evidence or Argument That Its Proposed Combination Satisfied the Board’s Construction, and Its Belated Argument Based upon a Purported “Concession” by Corephotonics Fails

Apple’s opening brief devotes roughly two pages to arguing that it should prevail on obviousness (of claims 1 and 23) even under the Board’s (i.e., Corephotonics’) claim construction. Blue Br. 53–55. This is not an argument that Apple made in its papers below. Appx21 (Board finding that “Petitioner’s only argument for how the combination of Parulski and Konno teaches this limitation is Parulski’s teaching of generating a fused image having a Wide position POV . . .”). *See In re Google Tech. Holdings LLC*, 980 F.3d 858, 863 (Fed. Cir. 2020) (“a position not presented in the tribunal under review will not be considered on appeal in the absence of exceptional circumstances”).

The Board’s factual determination that Apple failed to demonstrate that the prior art teaches claims 1 and 23 under the Board’s construction is reviewed for substantial evidence. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015). Here there was unquestionably substantial evidence to support the Board’s factual determination. *E.g.*, Appx588–589 (19:6–20:1) (Apple’s counsel at oral argument agreeing

that its position in the petition was that the proposed combination would only preserve “the wide position point of view and not both the wide position and the wide perspective point of view”); Appx5549–5551 (52:25–54:20) (Apple’s expert testifying he had not offered any opinion that the combination of prior art would produce a “fused image in which the shapes of objects reflect those of the Wide camera” or any opinion that Parulski satisfies Corephotonics’ proposed construction).

Apple’s argument rests on a purported “concession” in Corephotonics’ sur-reply that “registering pixels to matching pixels” will necessarily “address” both position and perspective. Blue Br. 54 (citing Appx414). But Apple’s argument both ignores the context of Corephotonics’ statements and literally misquotes them by omitting the key word “the.” Corephotonics’ statement was not about “registering pixels to matching pixels” generally, but rather about “*the* registering pixels to matching pixels” described in column 5 of the ’479 patent. Appx414 (emphasis added). The argument Corephotonics was making in this part of its sur-reply was the same argument concerning line 5:23–33 of the ’479 patent specification made above, namely that if a system that registers after

shifting position retains object shapes, then registering in the same system without shifting position will also retain object shapes. Appx414–415.

“The registering pixels to matching pixels” in the context of the ’479 patent’s disclosed embodiments is just one step of several in a process that results in the fused image. Appx60 (Fig. 5, element 506). To say that this registering of pixels in the ’479 patent will “address . . . perspective” does not mean that registration alone in the ’479 patent embodiments is sufficient to produce an output with the perspective POV of the Wide image, let alone that *any* system that “matches” pixels will do so. A system could very well “address” object perspective while producing an output with the perspective POV of the Tele image or an output with some different perspective POV altogether. At the hearing before the Board, Corephotonics was clear that registration was not sufficient by itself to produce an image that preserves the shapes of objects from the wide image. Appx621–622 (52:20–53:5) (Corephotonics counsel explaining that in the ’479 patent Figure 5 embodiment, the error detection and rejection steps are required in order to preserve both shapes and positions of objects from the wide image).

Even if the statement in Corephotonics’ sur-reply were divorced entirely from context and read, as Apple suggests, as a categorical statement that “registration” always produces an output image with the POV required by the claims, that would not be enough to justify discarding the Board’s determination and the substantial evidence that supported it. That is because Parulski never mentions “registration,” *per se*. Nor is there anything in the record, beyond the say-so of Apple’s attorneys, that suggests that producing a “range map” in Parulski constitutes “registration.” The purported “concession” simply does not prove what Apple asks it to prove. The Board’s factual determination that Apple failed to demonstrate that the prior art teaches claims 1 and 23 under the Board’s construction should be affirmed.

2. Corephotonics Presented Numerous Arguments Against Obviousness that Apply Even under Apple’s Proposed Construction, Making Remand Necessary Should the Court Reverse the Board’s Construction

While Apple cites to cases where the Federal Circuit reversed a determination concerning obviousness, rather than remanding to the Board after reversing a claim construction, that was due to circumstances in those cases that are not present in this case.

In *Praxair*, the Board had already made the factual findings necessary to decide obviousness under the correct construction. *Praxair Distrib., Inc. v. Mallinckrodt Hosp. Products IP Ltd.*, 890 F.3d 1024, 1036 (Fed. Cir. 2018) (“The Board's uncontested findings regarding Bernasconi render claim 9 obvious under the proper reading of the claim.”) To the extent that the Federal Circuit made any further factual finding, it was the utterly undisputable proposition that a doctor who was “intensive[ly] monitoring” a patient for a known potentially fatal side effect of a treatment would have at least considered discontinuing the treatment after that serious side effect arose, rather than blindly letting the patient die. *Id.* at 1037.

In *Carrum*, the Court reversed an obviousness determination after reversing the Board interpretation of a disputed claim term. *Carrum Techs., LLC v. Unified Patents, LLC*, No. 20-2204, 2021 WL 3574209, at *6–7 (Fed. Cir. Aug. 13, 2021). But in that case there was no evidence presented that the prior art satisfied the term under its correct construction. *Id.* Indeed, the Board had analyzed the prior art disclosure and found only that it “does not preclude” the feature required under the Federal Circuit’s ultimate construction. *Id.* at *6.

In the present case, there are genuine issues of fact that the Board has not addressed and that make reversal improper. First, as the Board noted, Apple relied on combining “several different disclosures in Parulski” to purportedly satisfy the claims. Appx19. As Apple’s brief acknowledges, Corephotonics disputed that a person skilled in the art would have been motivated to combine Parulski’s teachings in the specific way that Apple proposed, Blue Br. 50–51, and disputed that a combination of these teachings would result in fusion, as Apple argued, Blue Br. 52–53.

As Apple’s own description of Parulski demonstrates, the scope and meaning of its teachings are open to debate, not fully addressed by the Board’s decision. For example, Apple cites to a portion of Parulski that describes “an enhancement signal that can be used to sharpen portions of the primary still image” and states without further support or explanation that this “enhancement signal” is “presumably, extracted pixels from the Tele image.” Blue Br. 49 (citing Appx1994 (22:40–43)). Corephotonics disputed Apple’s characterizations of Parulski and of the purported combinations of embodiments from Parulski. Appx283–286, Appx417–419. The Board recited Apple’s positions on these issues, without deciding whether Apple or Corephotonics was correct. Appx19–21.

This is far from the situations in *Praxair* or *Carrum*, where the Board had already decided the substantive factual issues or there was a lack of evidence supporting the other side under the correct construction.

Apple argues that all of Corephotonics' arguments against obviousness based upon combining embodiments in Parulski should be rejected as a matter of law. Indeed, it cites *General Electric* for the proposition that there is a "presumption" of a motivation to combine different embodiments within a reference. Blue Br. 51. This argument fails for multiple reasons. First, does not speak of a "presumption," at all. Second, the dispute in *General Electric* concerned motivation to combine embodiments from two different references (Wendus and Moxon), so that to the extent it says anything at all about combining embodiments of a single reference, such statements would be dicta. *General Electric Co. v. Raytheon Techs. Corp.*, 983 F.3d 1334, 1350, 1352 (Fed. Cir. 2020). Third, the part of *General Electric* quoted by Apple speaks of elements "present together" in a prior art reference and counsels against "dissect[ing]" a reference "into collections of individual elements," thereby "requiring a party showing obviousness to re-do the work already done in the prior art reference." *Id.* at 1352.

In other words, *General Electric* states that there is no need to show a motivation to combine elements in the way that a prior art reference has already combined them, by including them within a ***single*** embodiment. *General Electric* certainly does not announce a general presumption of motivation to combine ***different*** embodiments of a reference, in every possible manner that a party challenging the patent might suggest would satisfy a challenged claim. Indeed, the Federal Circuit has clearly stated that both a motivation to combine and reasonable expectation of success must be demonstrated, when seeking to combine multiple embodiments from the same reference. *In re Stepan Co.*, 868 F.3d 1342, 1346 n.1 (Fed. Cir. 2017) (“Whether a rejection is based on combining disclosures from multiple references, combining multiple embodiments from a single reference, or selecting from large lists of elements in a single reference, there must be a motivation to make the combination and a reasonable expectation that such a combination would be successful. . . .”)

Moreover, Corephotonics presented additional arguments against obviousness that Apple’s brief does not acknowledge and that the Board had no need to address (and thus did not address). Corephotonics pre-

sented extensive evidence of objective indicia of non-obviousness, including praise of Corephotonics' technology from Apple and interest from Apple in licensing Corephotonics' patents. Appx292–304. The Board's final written decision did not address this evidence. Apple's opening brief does not acknowledge this evidence, let alone establish it is insufficient to support a finding of non-obviousness. The Board should be given an opportunity to address this evidence of objective indicia on remand, rather than being reversed.

As to grounds 2–4 (concerning claims 2–9, 15, 24–31, and 37), Corephotonics presented arguments against obviousness that were specific to these grounds and the additional references at issue in these grounds. *E.g.*, Appx288–292. The Board's decision did not address those additional arguments. Appx22. As explained above, Apple forfeited its challenge concerning these grounds by failing to address them in its opening brief. But even if the Court were to permit a challenge extending to these grounds in this appeal, Apple has certainly failed to demonstrate that Corephotonics arguments concerning grounds 2–4 should be rejected by this Court. At the very least, grounds 2–4 should be remanded to the Board to address Corephotonics' arguments.

II. In the -00906 IPR, the Board Correctly Found that Apple Failed to Meet Its Burden of Demonstrating a Reasonable Expectation of Success, Based Upon Evidence and Arguments That Were Timely Raised in the IPR

Obviousness requires a “reasonable expectation of success in making the invention in light of the prior art.” *Amgen Inc. v. F. Hoffman-La Roche Ltd*, 580 F.3d 1340, 1362 (Fed. Cir. 2009). The Board correctly found that Apple had failed to demonstrate such a reasonable expectation of success. Appx43. This was not an issue that the Board raised *sua sponte*. Rather, it was an issue that Corephotonics had clearly and expressly raised in its papers, and the Board’s finding was based upon problems with Apple’s evidence that Corephotonics had identified in its response to the petition.

A. Corephotonics Clearly Raised the Issue of Reasonable Expectation of Success and Showed that Errors by Apple’s Expert Undermined Apple’s *Prima Facie* Case on This Issue; Apple Declined to Address These Errors in Its Reply

Apple cites the Smith textbook as saying that “[a] lens prescription can be scaled to any desired focal length simply by multiplying all of its dimensions by the same constant.” Blue Br. 68. But this is little more than a statement of what it means to “scale” a lens prescription. It is not a statement that such a scaled lens prescription will lead to a successful

lens. The statement in Smith is akin to saying that a drug formulation can be scaled to any desired dose by multiplying the quantities of its ingredients by the same constant, or that the length spanned by a bridge design can be scaled to any desired value by multiplying all of its dimensions by the same constant. It does not follow that scaling the dose of a drug down by a factor of 100 will yield a successful drug. Nor does it follow that scaling a two-foot-long bridge design made of popsicle sticks to span a mile-wide river will yield a successful bridge.

It is undisputed that Ogata—which claims priority to a set of 1993 patent applications—describes a traditional camera lens, with a 35 mm focal length, designed for use in a 35 mm film camera. Appx4796–4798 (¶¶ 59–63); Appx3645. It is also undisputed that Apple’s proposed obviousness combination requires scaling Ogata down by a factor of 6.114 in order to combine it with Parulski. Blue Br. 17; Appx4798 (¶ 63).

Corephotonics presented extensive evidence that it was recognized in the art that scaling lens designs by the factors proposed by Apple in its obviousness theory was not likely to succeed and therefore not done

in practice. Appx4802–4808 (§§ 70–79), Appx4820 (§ 105). Corephotonics’ evidence included a paper co-authored by Apple’s own expert Dr. Sasián, which states:

The design and packaging of a miniature camera lens module imposes optical design challenges. A traditional objective lens ***can not be simply scaled down*** as a lens solution due to fabrication constraints, materials properties, manufacturing process, light diffraction and geometrical aberrations.

Appx5076 (emphasis added). Corephotonics’ evidence also included a Ph.D. dissertation from a former student of Dr. Sasián who now works as an optical engineer at Apple, which states:

. . . . if the conventional camera lens was simply scaled down to the same focal length of the miniature lens, it would encounter many issues . . .

Appx5187; Appx4804–4805 (§ 74).

Apple argues that this evidence against an expectation of success is irrelevant, because these statements are purportedly limited to “miniature” lenses and because the scaled lens that Apple proposed is not “miniature.” Blue Br. 60. But it is false that Apple’s proposed lens is not “miniature.” It also would not save Apple’s obviousness theory if its lens was indeed not miniature.

According to Apple’s obviousness theory, the Ogata lens would have been scaled down to accommodate a “1/2.5-inch” sensor in order to be combined with Parulski. Blue Br. 60. Optical sensor formats are commonly specified as a particular fraction of an inch. Appx5069 (Table 1.1). Much like a “2x4” piece of lumber sold at a hardware store does not actually measure 2 inches by 4 inches, this sensor inch measurement does not actually correspond to any particular dimension of a modern digital sensor.² But the actual sensor dimensions are approximately proportional to the sensor format inch measurement, such that a 1/2-inch sensor is larger than (and generally requires a larger lens than) a 1/4-inch sensor, for example. Appx5069 (Table 1.1).

Relying on a table from the Galstain textbook, Apple argues that any camera using a sensor larger than a 1/3-inch sensor would not be considered miniature, because 1/3-inch is the largest example of a sensor for a “miniature camera module” given in Galstain. Blue Br. 60; Appx3957–

² Rather, the inch measurement corresponds to the outside diameter of the glass envelope of a (now-obsolete technology) video camera tube that would have had the same sensitive area as the digital sensor. See https://en.wikipedia.org/wiki/Optical_format; https://en.wikipedia.org/wiki/Video_camera_tube.

3958. But far more relevant than what the Galstain author gives as examples of miniature cameras is what Dr. Sasián—the author or the Ph.D. advisor of the author of the statements about scaling lenses quoted above—considers to be miniature. In his expert declarations and testimony in this case, Dr. Sasián opined that a prior art camera with a 1/1.7-inch sensor was a “miniature camera module”:

. . . Konno’s Example 2 lens system is a miniature camera module using a sensor with an image height of 5.8 mm, which translates closely to a 1/1.7” sensor . . .

Appx3958; Appx5639–5640 (49:7–50:10) (testimony confirming that he said that a camera with a 1/1.7-inch sensor was a “miniature camera module” and that a 1/1.7-inch sensor is larger than a 1/2.5-inch sensor). If a camera with a 1/1.7-inch sensor is considered a “miniature” camera by Dr. Sasián, then so is a camera with a significantly smaller 1/2.5-inch sensor, and Dr. Sasián’s statement that traditional lenses “can not be simply scaled down” applies to scaling Ogata’s lens for a 1/2.5-inch sensor.

Even if it were true that the 1/3-inch sensor format was some sort of cut-off for “miniature” lenses, it would not follow that one skilled in the

art would have expected scaling to a 1/2.5-inch sensor format to be successful. Nothing in the record suggests that the 20% difference in dimensions between the 1/3-inch format and 1/2.5-inch format is what causes the difficulty in scaling. Rather, the evidence indicates that it is scaling conventional lenses down by large factors that causes problems. For example, the Ph.D. dissertation from Dr. Sasián's student (now an optical engineer at Apple) stated that:

Scaling down a conventional camera lens requires spatial tolerances to scale down with the same ratio, which is ***about the factor of 7***. This creates a huge problem on the tolerance budget of element and surface decenter.

Appx5191 (emphasis added). As noted above, Apple's obviousness theory requires scaling Ogata down by a factor of 6.114. Blue Br. 17; Appx4798 (¶ 63).

Apple's brief leaves the impression that the expectation of success issues raised by Corephotonics were limited to issues with manufacturability of the scaled lens. Blue Br. 58, 61 (referring to "the practicality and manufacturing concerns at the heart of Corephotonics's non-obviousness argument"). It is true that Corephotonics presented extensive evidence on the issue of manufacturability of the scaled-down lens prescriptions and that the non-manufacturability of the proposed design is, by itself,

fatal to Apple’s theory. But, manufacturability is just one of many problems with Apple’s scaling theory that Corephotonics raised. Appx4802–4808 (¶¶ 70–79); Appx4819–4821 (¶¶ 104–107). For example, the quote from Dr. Sasián’s paper saying that traditional lens designs “can not be simply scaled down” points to manufacturing concerns, but also points to issues of lens performance unrelated to manufacturing, such as “light diffraction and geometrical aberrations.” Appx5076.

Given that Corephotonics clearly disputed that the proposed scaling had a reasonable expectation of success and given that it was Apple’s burden to show obviousness by a preponderance of the evidence, the Board naturally considered whether Apple had presented evidence on the scaling of Ogata’s lens sufficient to demonstrate such a reasonable expectation of success. Apple’s petition relied on the Smith textbook and Dr. Sasián’s declaration together in arguing for an expectation of success. Appx753–754 (“Based on Smith and as shown in Dr. Sasián’s declaration, a POSITA would have recognized that Ogata could have been successfully scaled for a 1/2.5” image sensor”). In its reply, Apple pointed again to Dr. Sasián’s “lens design software analysis” as “confirm[ing] the viability” of the scaled Ogata lens design. Appx1036. But Apple’s reply

never even mentioned Smith as supporting a reasonable expectation of success, let alone suggested that Smith alone was sufficient to support such a reasonable expectation.

Beyond quoting Smith himself, the only analysis that Dr. Sasián provided to support the “viability” of the scaled Ogata lens design was his lens design software analysis, contained in Figures 3A-3C of the appendix to his declaration. Appx2717–2719 (¶¶ 37–39), Appx2731–2733. But as Apple’s brief acknowledges, Dr. Sasián used an incorrect value for one of the physical properties (the Abbe number) of one of the lens elements in the Ogata design. Blue Br. 26. As a result, Dr. Sasián’s lens design software analysis did not accurately reflect how the scaled Ogata design would refract (bend) light. *Id.* Apple does not dispute that the lens-performance calculations (field curvature, distortion, and optical path distance (OPD) fan plots) in Dr. Sasián’s are incorrect as a result of this error. Appx4798 (¶ 62). After Corephotonics pointed out Dr. Sasián’s error, Appx932, Dr. Sasián submitted a reply declaration, where he could have corrected the error in his analysis of scaling the Ogata lens. Appx3954. Indeed, he presented a new lens design software analysis in this reply declaration, concerning a new way he proposed to modify and

scale the Kawamura lens design. Appx3970–3971. But he made no effort to remedy the errors in his analysis of scaling the Ogata lens.

Rather than dispute its expert’s error, Apple suggests that the error is irrelevant. First Apple suggests that Corephotonics endorsed the reliability of Dr. Sasián’s analysis by relying on it to “confirm” its own expert’s analysis. Blue Br. 59. But what Corephotonics said Dr. Sasián’s analysis “confirm[ed]” had nothing to do with the performance or suitability of the scaled Ogata lens. Rather, his analysis “confirmed” that the original Ogata design was designed for a 35 mm format film camera. Appx930–933.

Second, Apple argues that Smith by itself was sufficient to establish a reasonable expectation of success. Blue Br. 68. As noted above, Apple never took this position before the Board, instead relying on Smith and Dr. Sasián together in the petition, Appx753–754, and on Dr. Sasián alone in its reply, Appx1036. A review of Smith shows why.

The page that Apple relies on from Smith states that a lens prescription can be scaled by multiplying all of its dimensions by a constant, but it also makes clear that this scaling has consequences. Appx2678. Some

parameters of the lens are unchanged by scaling, while the so-called “*linear* aberration measures” are scaled by the same constant as the lens dimensions, Appx2678. But the very next paragraph from Smith indicates that is not the end of the story, because other aspects of lens performance change with scaling. In particular “[t]he exact *diffraction* MTF cannot be scaled with the lens data,” and the “*geometric* MTF can be scaled” but is generally “quite inaccurate.” Appx2678. Issues with “diffraction” and “geometrical aberrations” are among the reasons Dr. Sasián’s paper cited for why a traditional lens design “can not be simply scaled down.” Appx5076.

A review of Smith also shows that evaluating whether a design is “good enough” requires either computer calculation or some other suitable analysis. Appx2664–2669. Smith explains that a “commonly utilized measure of performance is the modulation transfer function [MTF], which describes the image modulation or contrast as a function of the spatial frequency of the object or image.” Appx2666. In other words, Smith’s teaching that the MTF cannot be scaled when the lens is scaled implies that this commonly utilized measure of lens performance will change as a result of scaling. Smith’s statement that a lens prescription “can be scaled” is not a statement that the result of that scaling will be a

successful lens. Something more than Smith is required to show an expectation of success, and given Dr. Sasián’s erroneous and uncorrected analysis, Apple has no other reliable evidence to offer.

B. Substantial Evidence Supports the Board’s Determination that Apple Had Failed to Establish a Reasonable Expectation of Success

The Board’s determination that Apple failed to meet its burden to show a reasonable expectation of success is supported by substantial evidence. It is undisputed that Dr. Sasián used an incorrect value for the Abbe number of one of the Ogata lens elements and that this error alone renders his lens-performance calculations for the scaled Ogata lens inaccurate. Blue Br. 26; Appx4798 (¶ 62). The Board’s determination that Apple failed to present sufficient evidence can itself meet the substantial evidence standard. *Comcast Cable Commun., LLC v. Promptu Sys. Corp.*, 838 Fed. Appx. 555, 557 (Fed. Cir. 2021) (“Substantial evidence supports the Board’s finding that Comcast failed to show a motivation to combine . . .”).

Apple argues that the Board incorrectly identified other errors in Dr. Sasián’s analysis, concerning “aspherical surface[]” data. Blue Br. 65–67.

Accepting *arguendo* that the explanation that Apple provides in its opening brief for the differences in these values is correct, that does not undermine the Board's decision. Because it is undisputed that the Abbe number error itself renders Dr. Sasián's lens-performance calculations for the scaled Ogata inaccurate, it is immaterial whether he made further errors in his work that would independently render his calculations inaccurate.

After noting the aspherical surface data in the first full paragraph of page 15 of the Final Written Decision, the Board's analysis of Dr. Sasián's opinion and of Apple's burden to correct the error in his opinion never mentions the aspherical surface data, apart from in a footnote concerning Kawamura. Appx39–43. The Board's conclusion was that Apple had failed to demonstrate a reasonable expectation of success for scaling Ogata, and its analysis on that point is fully supported by the acknowledged error in the Abbe number, regardless of whether there were additional errors concerning the aspherical surface data or not.

C. Apple Had Proper Notice of the Issues and Evidence Underlying the Board’s Decision and Its Need to Respond to Them; Apple Is Not Entitled to Remand Under the Administrative Procedure Act

The Board did not violate the APA by finding that Apple failed to demonstrate a reasonable expectation of success as to scaling the Ogata lens. The issue of reasonable expectation of success was unquestionably raised in Corephotonics’ response to the petition and in its supporting expert declaration. Appx940–946, Appx958–960, Appx4802–4808 (¶¶ 70–79), Appx4820 (¶ 105). The issue of the Abbe number error and the resulting incorrectness of Dr. Sasián’s performance calculations was likewise raised by Corephotonics, not *sua sponte* by the Board. Appx932.

It is true that Corephotonics devoted numerous pages of its briefing to issues other than Dr. Sasián’s calculations, including presenting extensive affirmative evidence against the combination proposed by Apple, Appx937–960, a non-obviousness argument that was based on claim construction, Appx960–967, arguments specific to the dependent claims, Appx967–969, and evidence of objective indicia of non-obviousness, Appx898. But the Administrative Procedure Act does not require that the Board adopt the arguments that a party devoted the most pages to or even that the party may have thought were most promising.

Apple has the burden of showing obviousness and was required to present at least a *prima facie* case of obviousness, including a reasonable expectation of success. *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007) (“the burden falls on the patent challenger to show . . . that a person of ordinary skill in the art would have had reason to attempt . . . and would have had a reasonable expectation of success in doing so”). Corephotonics pointed out a serious error in Apple’s *prima facie* case in its response to the petition. Appx932; *see also* Appx1197.

Apple cannot reasonably claim to be surprised that the Board examined Apple’s *prima facie* case or that it found that case sufficiently lacking that there was no need to consider Corephotonics’ other arguments. In leaving its expert’s erroneous analysis uncorrected, and in fact continuing to rely on that original erroneous analysis in its reply, Appx1036, Apple ran the risk that the Board would decide the case the way that it did.

The cases that Apple cites supporting remand after a *sua sponte* finding of the Board involved very different situations from the present case. These cases involved more than the Board focusing on issues the parties

had treated as less important, for example. Rather, they involved either obviousness determinations based upon prior art that the parties had never applied against the claims in question or Board decisions that deviated from apparently settled claim constructions.

In *IPR Licensing*, the Board made a finding of obviousness that relied on a prior art reference from a non-instituted ground. *In re IPR Licensing, Inc.*, 942 F.3d 1363, 1369 (Fed. Cir. 2019) (“The Board therefore cannot rely on evidence relating solely to grounds on which it never instituted.”) Because the evidence at issue was not part of the instituted IPR, the patent owner had no notice that the Board might rely upon it in its final written decision. *Id.*

In *Nike*, the IPR was remanded to the Board after appeal, and on remand the Board determined for the first time that given prior art reference satisfied a limitation of a particular substitute claim. *Nike, Inc. v. Adidas AG*, 955 F.3d 45, 53 (Fed. Cir. 2020). The petitioner had never relied on this reference in challenging the patentability of the claim, and the Board had never given the patent owner notice—before remand or after—that it would rely on this reference as satisfying that claim limitation. *Id.*

In *Qualcomm*, the parties had agreed on the interpretation of a particular claim term, but the Board adopted a construction that differed from the parties' agreed interpretation, without giving the parties any notice or opportunity to respond that that construction. *Qualcomm Inc. v. Intel Corp.*, 6 F.4th 1256, 1263 (Fed. Cir. 2021).

Somewhat similarly, in *SAS Institute*, the Board had adopted a construction in its institution decision, which the patent owner agreed with and did not dispute in its patent owner's response. *SAS Inst., Inc. v. ComplementSoft, LLC.*, 825 F.3d 1341, 1351 (Fed. Cir. 2016), *rev'd and remanded sub nom. SAS Inst., Inc. v. Iancu*, 200 L. Ed. 2d 695 (Apr. 24, 2018). But the Board then adopted a different construction in its final written decision, without providing the patent owner any notice that the Board's claim construction might change or that it needed to address other claim constructions in its briefing. *Id.*

This is not a case where the Board materially misunderstood or ignored Apple's arguments. Apple concedes that Dr. Sasián's analysis of scaling Ogata was erroneous and went uncorrected. The Board correctly found that this meant Apple had failed to carry its burden on reasonable

expectation of success. The Board's decision in the -00906 IPR should be affirmed.

CONCLUSION

For the foregoing reasons, the Board's claim construction in IPR2020-00905 should be affirmed, as should its conclusion that Apple failed to demonstrate obviousness. Should the claim construction be reversed, the IPR should be remanded, not reversed as Apple proposes. The Board's decision in IPR2020-00906 should likewise be affirmed.

Dated: October 3, 2022

Respectfully submitted,

/s/ Neil A. Rubin

Marc A. Fenster

mfenster@raklaw.com

Neil A. Rubin

nrubin@raklaw.com

James S. Tsuei

jtsuei@raklaw.com

RUSS AUGUST & KABAT

12424 Wilshire Boulevard, 12th Floor

Los Angeles, CA 90025

Telephone: 310-826-7474

Attorneys for Patent Owner-Appellee,
COREPHOTONICS, LTD.

CERTIFICATE OF COMPLIANCE

The foregoing filing complies with the relevant type-volume limitation of the Federal Rules of Appellate Procedure and Federal Circuit Rules because the filing has been prepared using a proportionally-spaced typeface and includes 10157 words.

Dated: October 3, 2022

/s/ Neil A. Rubin

Neil A. Rubin